

d.) Remarks.

Claims 23-49 and 52-54 and 76-103 are pending with claims 55-75 having been withdrawn.

Remarks Regarding 35 U.S.C. § 102(e).

Claims 23-49, 52-54 and 76-103 stand rejected, under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent No. 6,683,783 ("Smalley"). Applicant respectfully traverses this rejection and all comments made in the Office Action, but responds to the Examiner's comments therein as follows.

In the Office Action at paragraph (a), it is alleged that Smalley discloses that "*carbon nanotubes when subjected to the electric field align and orient themselves in direction perpendicular to the field*" (Smalley, column 3, lines 30-32), "*SWNT aggregating in substantially parallel orientation*" (Smalley, column 21, lines 35-37), and "*making arrays of CNTs*" (Smalley, column 29). Applicant respectfully disagrees with each statement.

First, having carbon nanotubes aligned and oriented in a direction perpendicular to an electric field does not mean that the carbon nanotubes possess electromagnetic shielding properties. Applicant's invention necessarily requires the nanotubes in the claimed composite to have a specific aspect ratio, orientation and alignment that create the desired electromagnetic shielding and/or low observability properties.

In the Office Action at paragraph (b), it is alleged that Smalley discloses that "*carbon nanotubes of Smalley are utilized in RF shielding applications*" (Smalley, column 18, lines 45-47). Applicant again respectfully disagrees.

Smalley merely states, in the most general and broad manner, that carbon nanotubes may be utilized in RF shielding applications. Nevertheless, this is not applicant's claimed invention. The instant claims are directed to carbon nanotubes having an aspect ratio, an orientation and an alignment (none of which are disclosed or suggested), that provides electromagnetic shielding (also not broadly disclosed or suggested). Furthermore, Smalley fails to disclose or suggest the shielding composite having both electromagnetic shielding

and/or low observability, or the method of making such a composite. Orientation, alignment and aspect ratio of the SWNT after thorough experimentation and testing by applicant, resulted in the shielding disclosed and claimed in the present invention. Smalley makes no connection between these characteristics and EMI shielding.

In the Office Action at paragraph (c), it is alleged that Smalley discloses: "*Simply that the extrusion in Smalley would have the same effect as the extrusion in claim, for example, 41 of the present invention as it imparts the same type of shearing force*" (no citation in Smalley is provided). Applicant respectfully disagrees.

Carbon nanotubes do not inherently provide electromagnetic shielding. It is also not inherent that extruder or injection molding machinery imparts shielding properties and no references have been cited by the examiner that would lead one skilled in the art to that conclusion. Further, Smalley makes no connection between use of extruder or injection molding technology, or any such equipment, and shielding. It is also not required that such machinery be used in the formation of articles noted by the examiner. For example, a sonar dome may be formed by impregnating layers of carbon with a thermosetting epoxy resin, pressurizing, and polymerizing in an oven without the use of an extruder. No extruder technology is required.

In the Office Action at paragraph (d), it is alleged that: "*Smalley discloses all the points raised by the applicants in arguments a-c*" (no citations in Smalley are provided). Applicant respectfully disagrees.

Again, the properties of the present invention are not inherent in the prior art of Smalley. For a reference to anticipate a claimed invention, the reference must fully anticipate each and every element of the claimed invention. Smalley fails to enable anyone, even those skilled in the art, to make a carbon nanotube composite with EMI shielding. Smalley did not describe nor seek to patent a composite with EMI shielding. Smalley described and sought to patent merely a composition of matter comprising single-walled carbon molecules, a felt comprising single-walled carbon nanotubes, and a tubular carbon molecule. In col. 18, lines 45-47, Smalley only suggests that the tubular carbon molecules *may* be used in RF shielding.

This does not rise to the strict standard of anticipation necessary for a statutory 102 rejection requiring enablement and disclosure of the claimed invention, nor does it even suggest connecting applicant's claims regarding aspect ratio, orientation and alignment, with shielding.

In the Office Action at paragraph (e), it is alleged that: "*Because the composite contains carbon nanotubes, it does not necessarily mean that the composite will possess property of electromagnetic shielding*" was not a compelling argument (no citations in Smalley are provided). Applicant respectfully disagrees.

Again, carbon nanotubes do not inherently have shielding properties. Orientation, alignment and aspect ratio of SWNT after thorough experimentation and testing by applicant achieved the degree of shielding disclosed in the present invention.

In the Office Action at paragraph (4), it is alleged that:

"Applicant's claims disclose composite comprising carbon nanotubes and alignment. The orientation and alignment in the claims refers to the carbon nanotubes and not to the composite, which further means that there is no structural meaning to the word 'composite'. The prior art of Smalley teaches carbon nanotubes either alone by themselves, with polymers or protruding from some other surfaces. The prior art of Smalley even discloses rendering carbon nanotubes alive (i.e., chemical functionalization) in order to be able to react the ends together and therefore from one long nanotube. Even carbon nanotubes alone, satisfy the definition of composite as described in any dictionary. Composites in prior art of Smalley are further discussed in col. 29, lines 31-35."

The composites of Smalley do not anticipate nor suggest the composite of the claimed invention. Col. 29, lines 31-35 of Smalley describe a hexaboronitride lattice. These *graphene-like sheets* are not similar in any manner to the composite of the claimed invention that requires a specific combination of aspect ratio, orientation and alignment for EMI shielding. Smalley discloses a matrix-type lattice that does not anticipate the structure of the claimed composite.

To Summarize

Nowhere in Smalley is any connection made between electromagnetic shielding and the properties of aspect ratio, orientation and alignment, and no where are these properties disclosed, discussed or even suggested. Electromagnetic shielding is not an inherent property of carbon nanotubes, nor is it a “necessary function” of carbon nanotube containing composites. Mere speculation that carbon nanotubes may be used with RF shielding does not anticipate the necessary experimentation necessary to form a composite with EMI shielding. Only after deliberate experimentation to achieve the specific combination of aspect ratio, orientation and alignment of the carbon nanotubes can formation of a composite result in EMI shielding and/or low observability.

None of the Examiner’s comments in the Office Action are directed to applicant’s “claimed” invention. No connection whatsoever was made between orientation, alignment and aspect ration of the tubes themselves, with Smalley. Accordingly, the rejection of claims 23-49, 52-54 and 76-103, under 35 U.S.C. § 102(e), is moot or overcome and applicant respectfully requests that it be withdrawn.

Conclusion

In view of the foregoing remarks, reconsideration of the application and issuance of a Notice of Allowance is respectfully requested.

Applicant again respectfully requests rejoinder of claims 55-75, as indicated on page 4 of the Office Action (Paper No. 9) mail dated August 8, 2002. These claims are all directed to electromagnetic shielding with nanotubes, and thus, are believed to have been encompassed within the original search.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the number below.

Should additional fees be necessary in connection with the filing of this Responsive Amendment, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge **Deposit Account No. 50-1682 for any such fees, referencing Attorney Docket No. 143990.00101**; and applicant hereby petitions for any needed extension of time not otherwise accounted for with this submission.

Respectfully submitted,
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By

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